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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/678,603	10/03/2003	Eric B. Cummings	33531/US	6147

7590 10/26/2005

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EXAMINER
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FICK, ANTHONY D

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 10/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/678,603	<b>Applicant(s)</b> CUMMINGS ET AL.	
	<b>Examiner</b> Anthony Fick	<b>Art Unit</b> 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 October 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>6/7/2004</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION*****Specification***

1. The disclosure is objected to because of the following informalities: in equation 6, paragraph 61 the first term should read  $\left( \frac{\partial^2 \varphi_o}{\partial x^2} \frac{\partial \varphi_o}{\partial x} + \frac{\partial \varphi_o}{\partial z} \frac{\partial^2 \varphi_o}{\partial x \partial z} \right)$ , the  $E_x$  term in equation 7 should be squared; the reference to "Eq. 7" at the end of paragraph 69 should be "Eq. 9", and the reference "expression (8)" in the first line of paragraph 70 should read "expression (10)".

Appropriate correction is required.

***Claim Objections***

2. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 2 through 25 have been renumbered 3 through 26 respectively.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1 through 4, 6 through 8, 10 through 12, 17 through 21, and 23 through 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Washizu et al. (U.S. 6,875,329).

Washizu teaches a method for separating substances using dielectrophoresis. The device of Washizu consists of a substrate or base plate, a plurality of electrodes positioned for dielectrophoresis, and a hollow space in the substrate (column 10, paragraphs 1, 4, and 5, and figure 15). Since a valley is a "negative ridge" in the definition of the applicant, this meets all the requirements of claim 1. Washizu further teaches regions can be formed in several places or a plurality of insulating ridges as in claim 2 (column 10, paragraph 1). The substrate can be formed of glass or plastics, which are polymers (column 10, paragraph 5) thus meeting claims 3 and 4. Washizu also teaches the device contains a means for applying voltage to the electrodes (column 4, paragraph 6). This meets claim 6. Figure 17 shows an embodiment of the

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invention where the ridges define the bottom of a flow channel thus meeting claim 7 and to flow fluid into the channel requires fluid port connected to the channel as in claim 8.

A few configurations of ridges are shown in figures 3 through 5. These configurations show ridges at a variety of angles relative to the flow direction and choice of this angle would depend on the type of separation being carried out. Thus it would be obvious to one skilled in the art to choose an angle that would not block the flow, between 20 and 80 degrees or specifically 45 degrees, and the teachings of Washizu then meet claims 10 and 11. The ridges in figure 3 show first and second ridges at different angles with respect to the flow direction, thus meeting claim 12.

Washizu further teaches this device can be used for particle separation by exerting a dielectric force on the particles to be separated (column 11, paragraph 1). This meets claim 17. The types of particles are also described including living things such as eukaryotic cells (column 11, paragraph 5), thus meeting claim 18. The separation method taught by Washizu includes generating a non-uniform electric field across an insulating ridge or valley, passing a sample fluid containing the particles across the ridge, the motion of at least one particle is constrained by the electric field, and the particle is moved along the valley (column 13, paragraph 2). This matches all the requirements of claim 19. The particles are transported either with the dielectric force or a flow velocity (column 13, paragraphs 2 and 3). These requirements meet claims 20 and 21. In figure 17 and paragraph 2, column 17, Washizu teaches the sample fluid is flowed across the insulating ridge to contact the two, thus meeting claim 23 and as stated above the ridges can be positioned at angles with respect to the flow

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direction meeting claim 24. Also as stated above, the separation moves the particles into the valley or a concentration area, thus meeting claim 25.

5. Claims 1, 5, 7, 9, 10, 13 through 16, 19, 22 and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Fuhr et al. (U.S. 6,749,736).

Fuhr teaches dielectrophoretic diversion of particles. The teachings of Fuhr describe insulating ridges or surfaces on top of electrodes of various widths to produce a field gradient (column 5, paragraph 4). The separation devices of Fuhr are shown in figures 10, 14, and 15 and contain a substrate, an insulating ridge, and a plurality of electrodes to generate a non-uniform field, thus meeting claim 1. As described earlier, some insulating ridges of Fuhr are formed on top of the electrodes or supported by non-insulating material (column 5, paragraphs 3 and 5), thus meeting claim 5. The device shown in figure 15 has ridges on a surface of the first channel to meet claim 7 and a second fluid channel connected to the first fluid channel as in claim 9. Figures 5 and 6 show ridges with a variety of angles to the direction of flow and Fuhr teaches the channel shapes can include curves, angles or arcs (column 14, paragraph 2). The channel walls are insulating structures of elevation changes from the substrate. According to the definition of the applicant, the walls fit the requirements of ridges. Therefore Fuhr teaches ridges at a variety of angles to meet claim 10, and ridges that curve toward the concentration area as in claims 13 and 14.

The device of Fuhr in figure 15 has ridges parallel to the direction of the fluid flow. Since these ridges have the same characteristics as the application, they should also perform the same function of impedance matching. The amount of impedance

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matching ridges would change depending on the system involved; e.g. type of separation, electric field required, and amount of uniformity in the field required.

Therefore the device of Fuhr meets claims 15 and 16, as the ridges parallel to the flow would accomplish the task of impedance matching.

The separation method of Fuhr is shown in figure 15 and described in paragraph 4 of column 14. The method includes generating a non-uniform electric field across an insulating ridge, passing a sample fluid containing the particles across the ridge, exerting a dielectrophoretic force and constraining the motion of a least one particle, and transporting the particle along the ridge. The method meets claim 19. Fuhr further teaches the motion of the particles through the device can occur under the influence of a gravitational force (column 13, last paragraph) thus meeting claim 22. Figure 15 also shows the two ridges of the device and the motion of a particle first adjacent to the first ridge until the dielectrophoretic force is decreased and the particle is within the second channel. Once in the second channel the particle is transported to the second ridge by dielectrophoretic forces. Thus the device meets claim 26.

### ***Double Patenting***

6. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

7. Claims 1 and 2 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claim 1 of copending Application No. 10760139. The device of copending application No. 10760139 contains a non-uniform array of insulating features, which meets the requirements of claim 1 in the present application of an insulating ridge. Claim 2 of the present application requires a plurality of insulating ridges, which is also met by claim 1 of application No. 10760139. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

8. Claims 3 and 4 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claim 6 of copending Application No. 10760139. Claim 6 of application No. 10760139 requires the substrate comprise glass or polymers. This meets claim 3 of the present application requiring a glass substrate and claim 4 of the present application requiring a polymer substrate. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

9. Claims 5 and 6 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 7 and 8 of copending Application No. 10760139. Claim 1 of copending application No. 10760139 meets claim 1 of the present application as stated above. The other requirements of the claims are the same in both applications. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

10. Claims 17 and 18 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 10 and 11 of copending Application No. 10760139. Claim 1 of copending application No. 10760139 meets claim 1 of the present application



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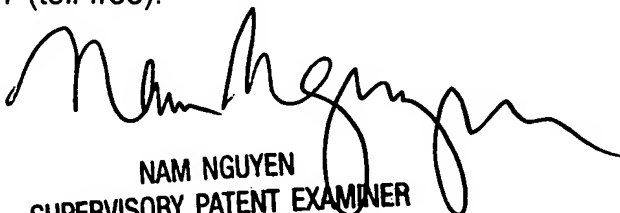
as stated above. The other requirements of the claims are the same in both applications. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Fick whose telephone number is (571) 272-6393. The examiner can normally be reached on Monday thru Friday 8 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anthony Fick     *ADF*  
AU 1753  
October 18, 2005

  
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